Revisions to document are completed as needed

Revised July 14, 2005
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COOKBOOK: Scanning Tie Cards, renaming, and linking scanned tie cards to computerized grid map

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Indiana Geographic Information Council
Indiana Society of Professional Land Surveyors (ISPLS - GIS/LIS Committee)
Office of the State Geodetic Advisor
Indiana County Surveyors Association
Private Industry

Developed for:
County Surveyors that would like to participate in putting the section corner perpetuation data sheets (tie cards) in an electronic format and make that electronic copy available to the Surveyors Office, citizens and other surveyors.

Benefits of Implementation:
The product (electronic tie cards located geographically) will result in time, effort, and money savings by those managing and utilizing the information. The process provides a mechanism for data quality and control. Offsite storage of files provides a backup file in case of disasters.

Purpose
This document outlines a how to process for County Surveyors and/or those scanning and renaming the tie cards files. Others will be able to utilize this approach without having to reinvent the process. Once the scanning and renaming are completed, the data will be linked to a GIS Framework layer of Tie Card information.

Equipment - Computer and Scanner
INGISI and ISPLS worked together to get a grant to purchase two scanner/printer/copiers and two computers. The equipment is available to county surveyors and/or ISPLS members that want to scan tie cards and/or rename the scanned files for this project. The checkout list can be found at www.IN.gov/ingisi (Geodetic Workgroup).

Computer Storage Space
The County Surveyor's Office will have a copy of the data created for the project. A copy of the data may reside in an offsite location for backup. The workgroup was asked to find a location where the data could reside offsite.

Initially the IU Bloomington Mass Storage System was going to be used for off site storage of a backup copy of the Tie Cards. Discussions concluded that the IU Mass

storage site could be utilized for data that did not need continuous maintenance. Therefore, the Tie Card files located offsite will be stored and linked from the Indiana Geological Survey website. There will be folders for each county were we can store the backup copies of the scanned tie cards. It will also provide storage space for counties that do not have enough computer storage space.

The process of updating the IGS website with new and revised tie cards is being formulated.

Components that will be needed for the project are (all discussed below):

- Grid Points (statewide) with state-wide naming convention (computer generated points on a map of approximate ¼, ¼, ¼ section corners).
- Scanned Tie Cards
- Renaming Software (version created on July 27, 2005)
- Adobe Reader Software – version 7 for Windows XP
- Database Table that is automatically created in the background when using the Renaming software
  (SectionAttributes.mdb is the Microsoft Access database created and the TieSheetData table is the table that contains all the data from using the Renaming software)

Process

The process for scanning PLSS tie card sheets and renaming the files with a meaningful file name is listed below. Each step or process is numbered (1,2,3,4 etc.)

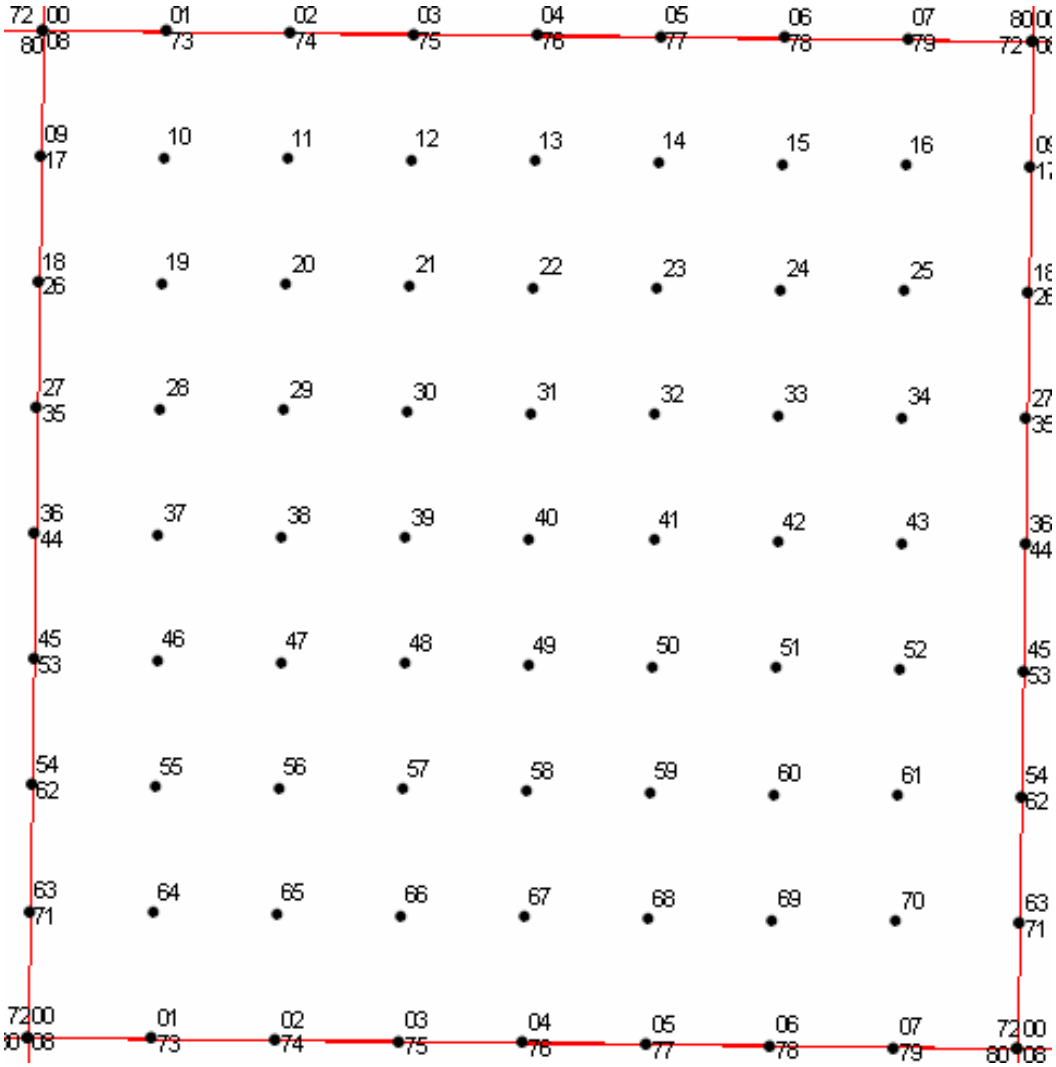
Phase I required that we develop a **naming convention** for the scanned tie cards that could be utilized State-wide

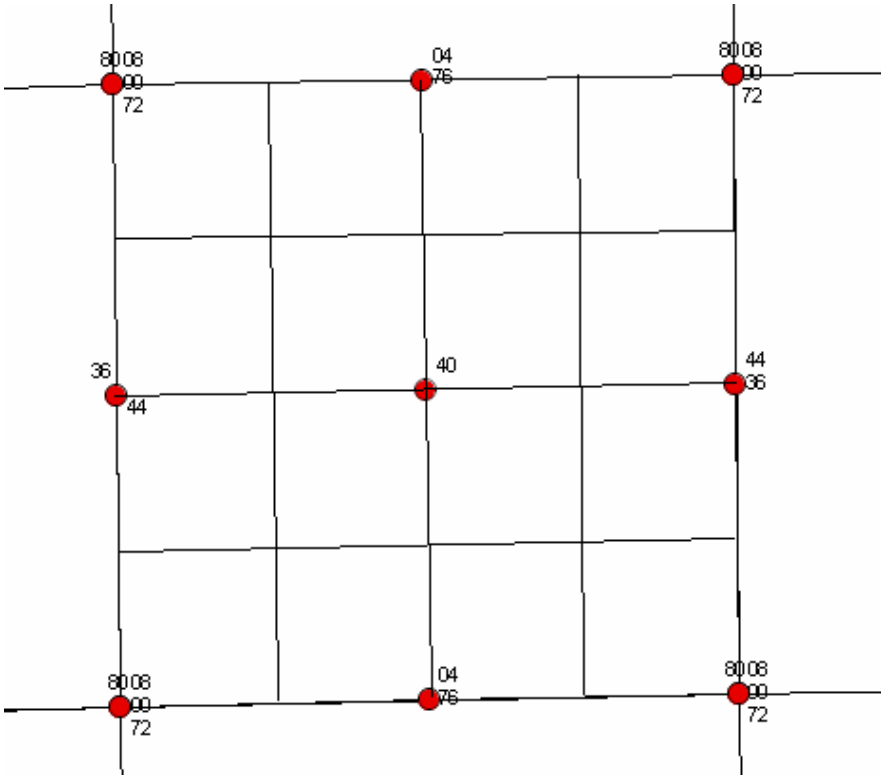
File naming conventions

The committee members developed a file naming convention to be used so anyone dealing with the files can tell immediately which file they need. Surveyor's use descriptions to describe a PLSS corner (ex. NE 1/4, NE 1/4, NE1/4, Section 03, T 23N, R 06W. The scanned tie card that is renamed will appear like:
IN02_T23NR06E03_08

Computer File Name will include - example
State Name and Prime Meridian – **IN02**
Township number - **T23**
Township direction – **N**
Range number – **R06**
Range direction – **E**
Section – **03**
Grid Number – **08** (Grid numbering system begins with 00 in upper left hand of section and ends in 80, bottom left corner)

The grid numbering takes into account that there may be four different entries at each section corner (intersection of four section corners) and two different entries at one point along the section line boundaries (a point is intersected by two adjoining sections- example below). Some counties may only use Grid points for eight points in each section, while other counties may use the ¼. ¼, ¼ grid points. Counties will only need to use the grid points that they have Tie Cards (PLSS section corner information) for.

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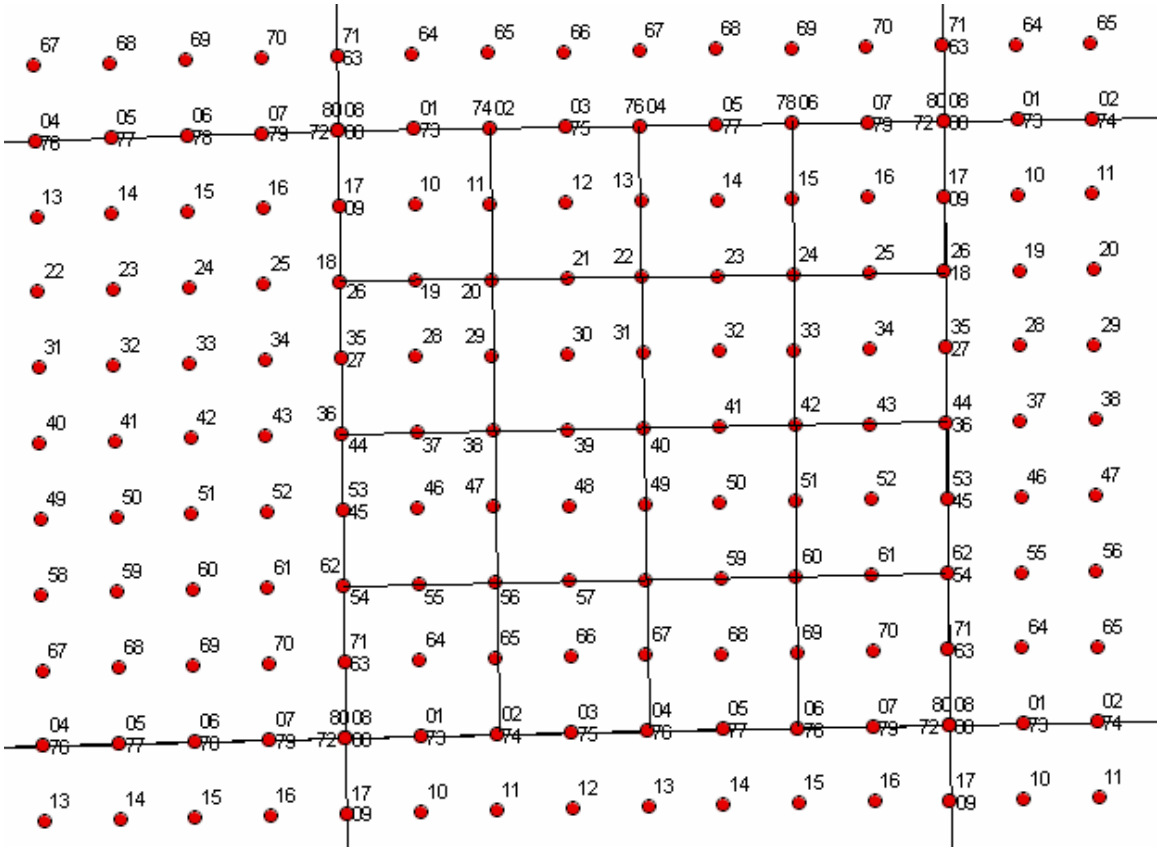
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26 19 20 18
31 32 33 34 35 28 29 30 31 32 33 34 35 28 29
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40 41 42 43 36 41 42 43 44 37 38
44 37 38 39 40 36
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76 77 78 79 72 00 73 74 75 76 77 78 79 72 00 73 74
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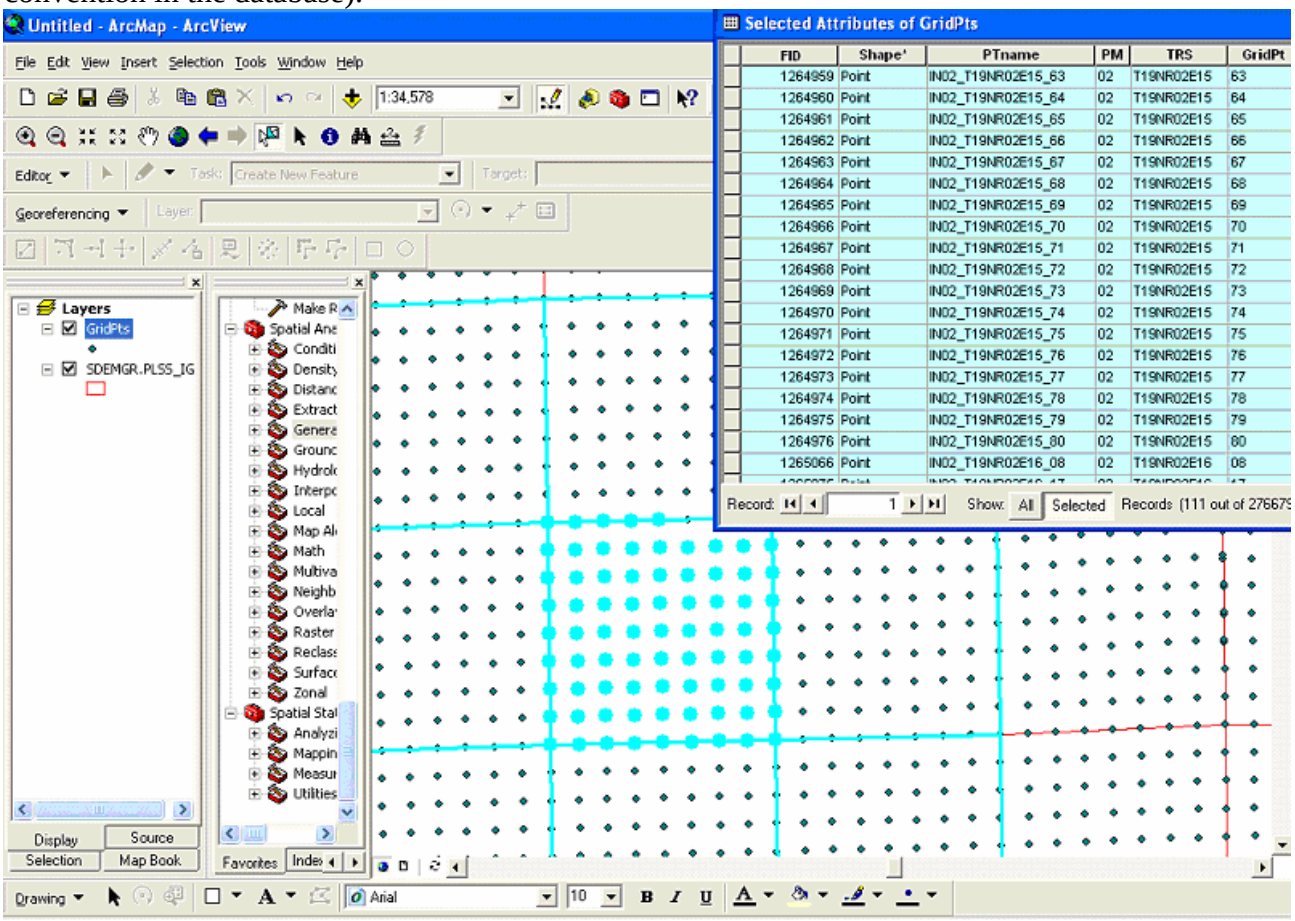
Phase II required a computerized **Point Grid Map** (shapefile) that could be used in a Geographic Information System to link the scanned tie cards to. Below is a screen shot of the Point Grid in a Geographic Information System (GIS) software (ArcGIS). All the data from the renaming software (described in Phase IV) will also show up in the GIS project table once the tables are linked. The "Point Grid" shapefile contains points that will be used to link the scanned tie cards to. The datasets are linked together using the Statewide file naming convention (contained in both the Point Grid shapefile and the database created while using the Renaming Software. You will be able to click on a point and the scanned tie card PDF file will pop up.

Grid Point Shapefile below (shows points on the map and the Statewide naming convention in the database).



The second **part of Phase II** was the development of a Tie **Card Renaming Software** that we can use. The software provides a user friendly screen that enables the computer users to see the scanned tie card (with a meaningless name) and rename the file very quickly and easily with the standardized file naming convention. More information will be provided under Phase IV.

Phase III – Scan section corner tie card files and save in a County Directory folder (numbered lines indicate action needed)

Set up a folder to store the scanned files in

1. Open Windows Explorer
2. Open **File** on the tool bar
3. Select **New**
4. Select **Folder**
5. Create a new folder with your County name: **ex. Marion**
6. Prepare to scan - Select the computer drive and file folder that the scanned documents will be sent to
7. Inset blank white card as a place holder where the index divider cards would be (this helps for refilling purposes, the blank computer files can be deleted quickly and easily)

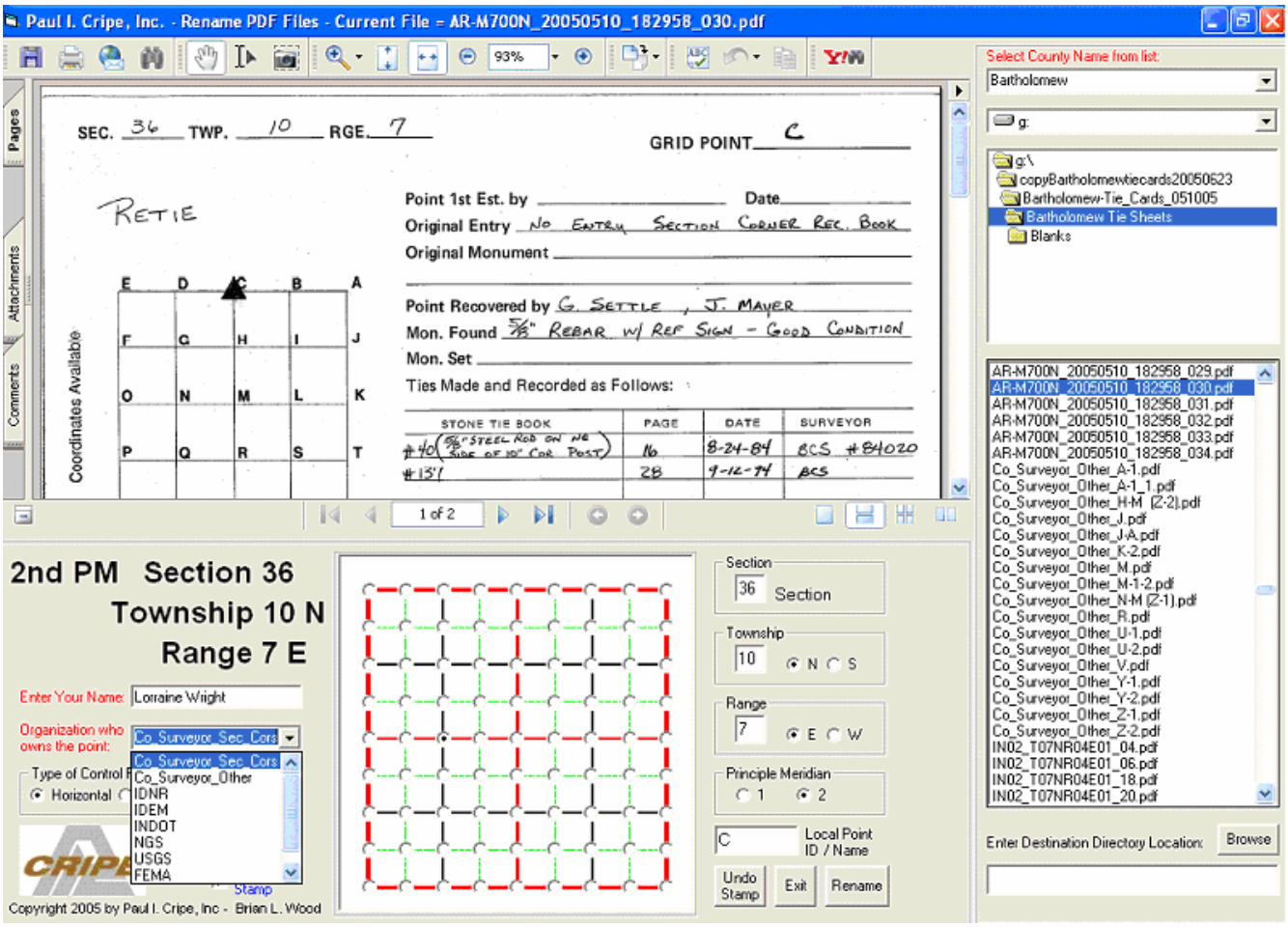
Begin to Scan

1. **Scan**: Take paper section corner tie card and scan.
2. Save the scanned documents as .PDF documents.
3. If your scanning software does not automatically save as a .pdf document you need to do the following:
    4. Select **File** on the tool bar
    5. Select **Save As**
    6. Select the **Save in box**
    7. Use the arrow to the right of the Save in box, find the drive letter and folder you want to save the files to: **C: Marion** (your County)
    8. Select the box **Save as type**: push the arrow to select .PDF
    9. Select **ok** to save
    10. The scanned documents will have meaningless file name (ex. AR- M700N_20050510_182958_30.pdf or 1234456.pdf)

Create a backup copy of all the scanned tie cards

1. **Create** a new folder called "Backup Tie Cards" and save it in a different location.
2. **Copy** the entire folder you previously used to put the scanned Tie Cards in, then paste all the files into the "Backup Tie Card" folder. You should now have two different folders with identical files.
3. You should not use the "Backup Tie Cards" folder. This folder is only used in case of an emergency.

Phase IV – Renaming the scanned tie cards with a meaningful name that can be associated with the "Point Grid Map" (shapefile). This can be accomplished by using the Renaming Software (example below).



The file names in the box (right side) are the scanned PDF document names (no meaning: AR- M700N_20050510_182958_30.pdf). Once the PDF file is renamed, using the software above, the file name would be:

IN02_T10NR07E_38
Prime Meridian_Township_Range_Section_Grid number

Grid top left starts at zero (00). Grid bottom right ends with (80).

Enter your County's name for the associated grid point in the box next to "Local Point ID Name". Example above: "C" All the County's names will be in the database (if entered) so you can use your own naming conventions too in the database or the map.

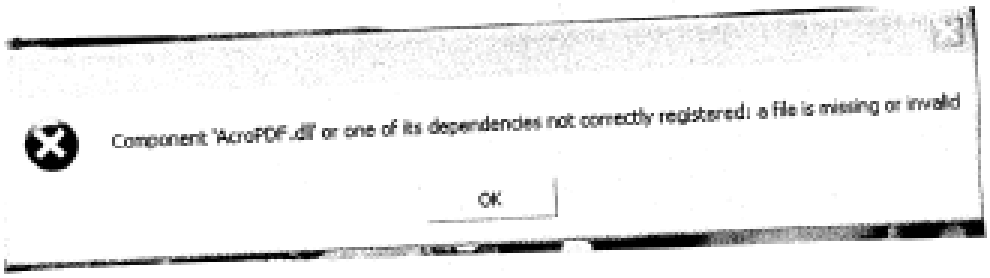
To use the Tie Card Renaming Software

1. Install renaming software
2. Install Acrobat Reader 7.0 for Windows XP.

You will need to install Acrobat Reader on your machine if you don't have it. The Acrobat Reader 7 for Windows XP is included on the Renaming Software disk if you need it. If you don't have Windows XP, you will need to go to the internet and download the most recent Acrobat reader available for the Windows

version of software you have on your computer. The Renaming Software was created using the Acrobat Reader 7.0 for XP.

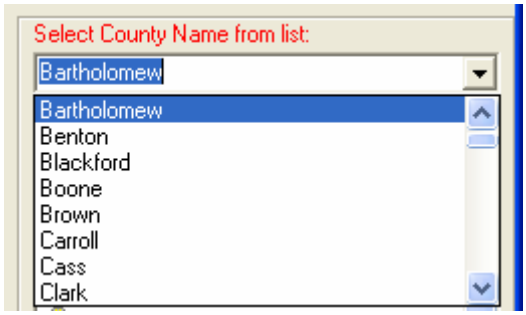
You might get errors below if your Adobe Reader version doesn't work with Renaming software.



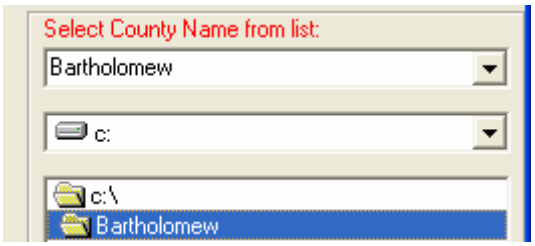
3 Reset computer screen resolution – Go to "Start button", "Control panel", "Display", "Settings, screen resolution" – use pointer on line to set at 1024 by 768 (this aligns the grid points properly in the Renaming Software)

4. Open the Renaming Software (when you loaded the software it should have placed an icon on your main computer screen called Tie SheetNames.

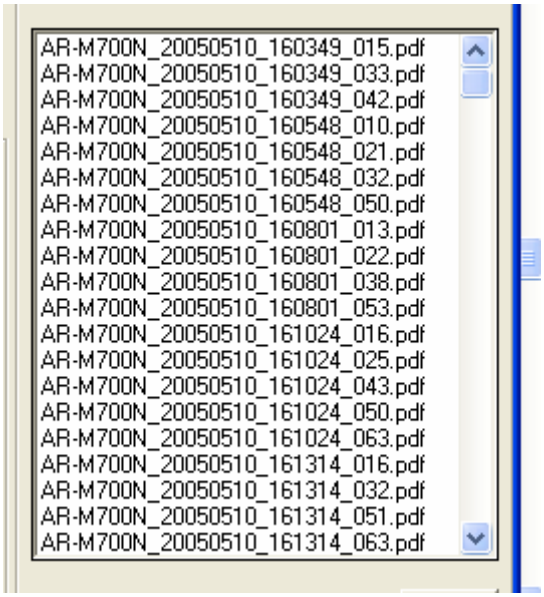
5. Begin on the top right part of the screen, "Select County name" from the drop down menu.



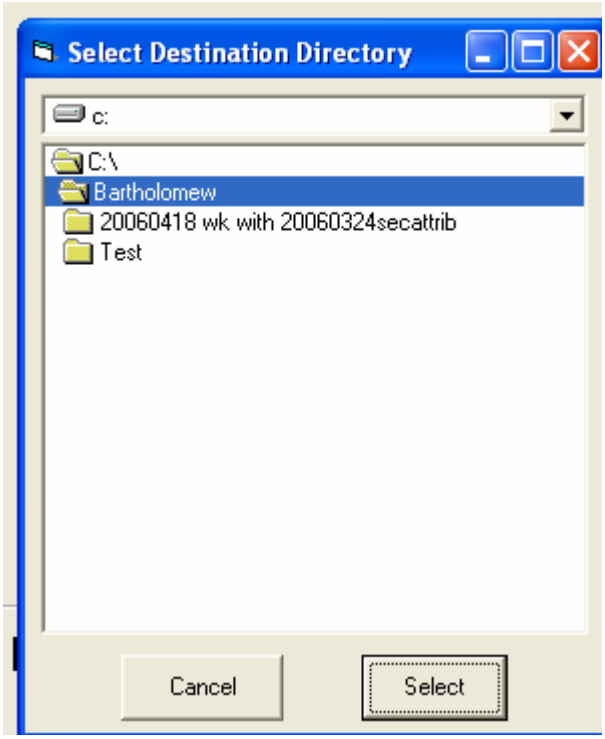
6. Select the drive and folder where the scanned tie cards are.



The meaningless file names appear in the box on the right side of the screen (usually some type of sequential number..

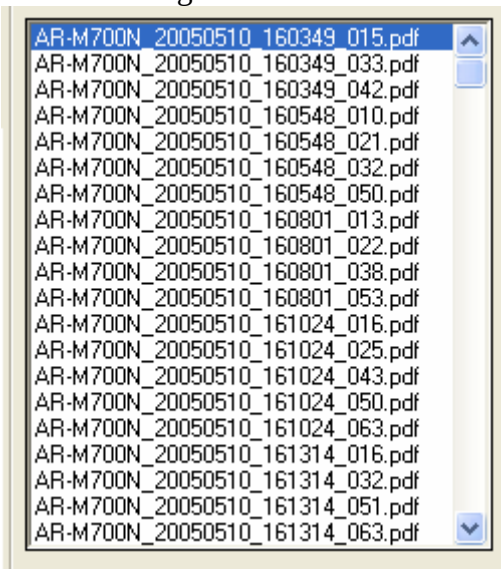


7. Enter the destination directory location. Use the browse button to select the drive and folder name where your saved your renamed tie cards to reside. If you have already saved some scanned tie cards as PDF documents in a folder you will want to select that folder using the browse button.

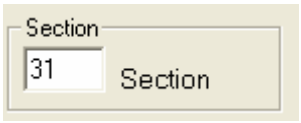


This is also the location that the SectionAttributes.mdb (Microsoft Access database) and the TieSheetData table will automatically be created. Make sure the destination directory is always set up correctly (very important).

8. Select (highlight) the first file name in the box on the right. The scanned pdf document will appear at the top left of the screen. Use the information on the scanned image to fill in the remaining information.

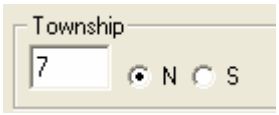


9. Enter the Section number



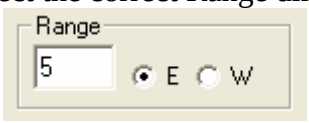
10. Enter the Township number

11 Select the correct Township direction



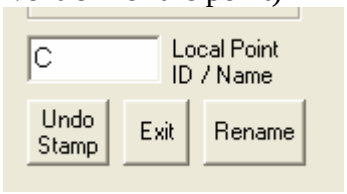
12. Enter the Range number

13. Select the correct Range direction



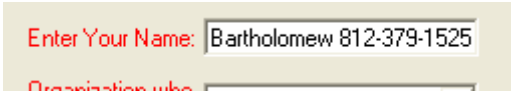
14. Select the correct Prime Meridian (1 or 2)

15. Enter the County's "Local Point, ID Name" (this is your Counties naming Convention for the point)



16. "Enter your Name"- Enter <u>County name</u>, <u>Surveyor's office telephone number, and your initials</u>

(ex: Bartholomew Co. 812-379-1525 LW)



17. "Organization who owns the point" - select <u>owner</u> from the drop down box of

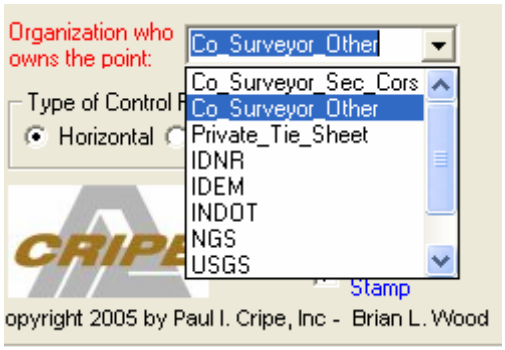
"<u>Co_Surveyor_Sec_Cors</u>" - for PLSS corners

or

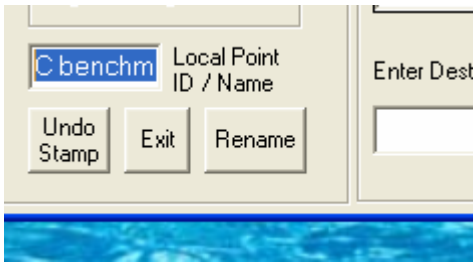
"<u>County Surveyor other</u>" - The "County Surveyor other" can be used for witness monuments, benchmarks, property corners, etc.

or

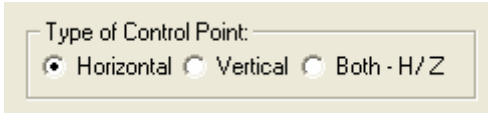
"<u>Private Tie Sheet</u>" – This would be Private contractors Tie Sheet that you are utilizing for your corner Tie Card.



If you want to be able to distinguish the type of "County Surveyor Other" corner, enter the designation in the "Local Pt/ID Number" box. after your counties naming convention. Example of entry in the "Local Pt/ID Number" box - C benchmark, C witness, or C property corner.

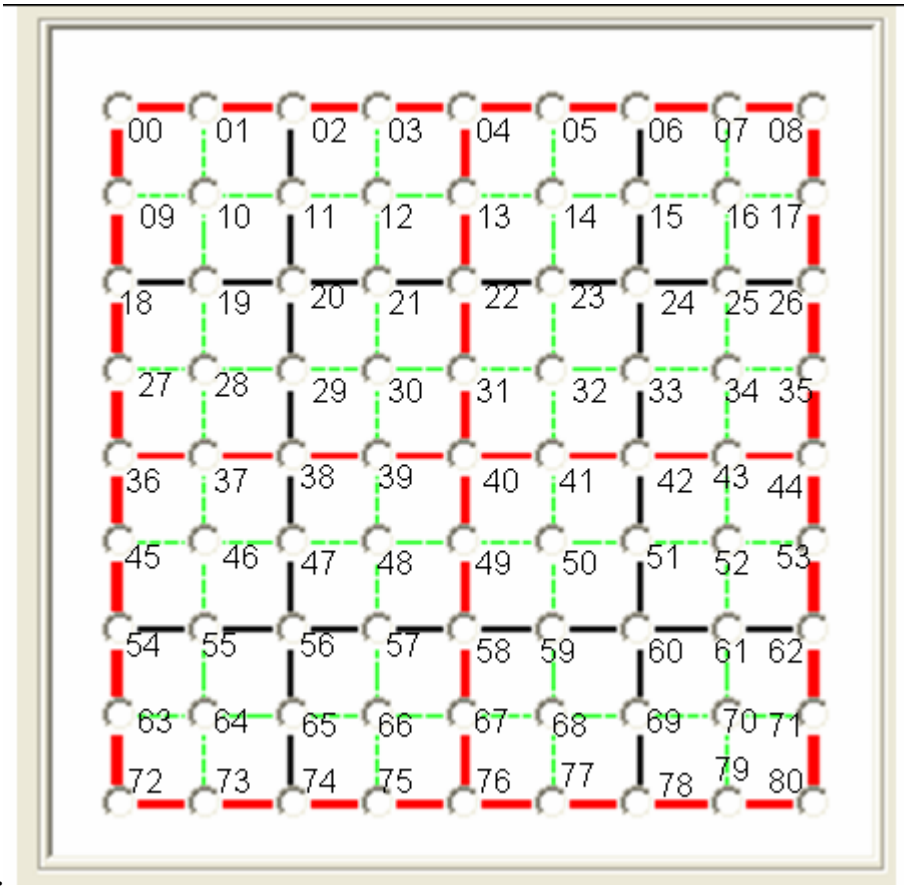


18. Select type of control:
    Horizontal
    Vertical
    Both



19 .Click "Apply date stamp" 

20. Click the circle on the map that represents the corner described on the scanned tie card image



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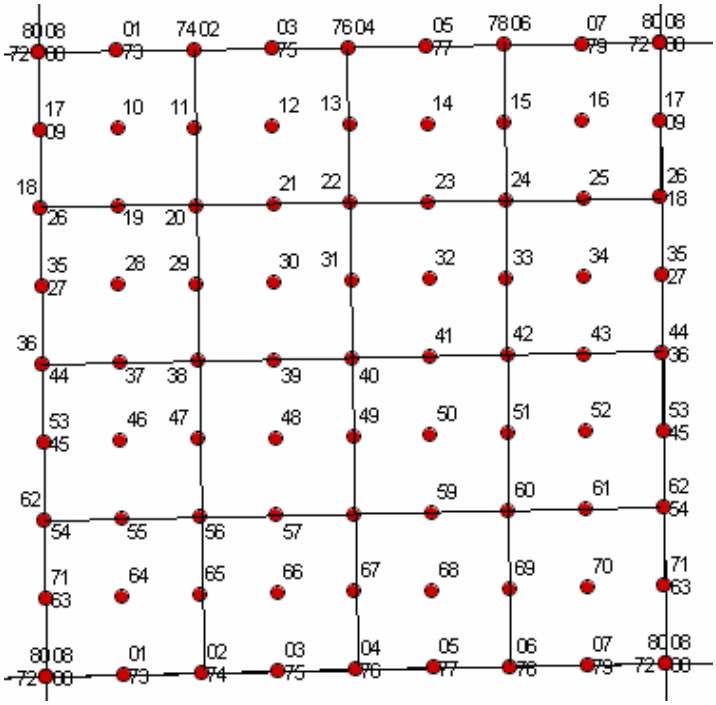
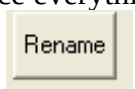


21. Once everything is filled in and verified, click the “Rename “ button.



22. Notice the meaningless file name disappears from the box on the right and the renamed file will show up with the new file naming convention (may have to scroll to the very end of the files to see the renamed file).
23. Start the process over on the next file. Many of the items will already be entered from the previous card. Change items that require changing. Verify information on scanned tie card matches the information in the boxes before you hit the rename button. Hit the rename button.
24. Continue renaming scanned images or Tie Cards until all documents are renamed.

Creation of a database
An Access database file (.mdb extension) is automatical created from the data that is entered into the Renaming Software. This database will be used with the Point Grid Map (shapefile) to link the information together in the Geographic Information System software.

Phase V – Link the scanned (PDF documents) to a GIS system so one can click on a point on the map and the scanned tie card will popup.

Lorraine Wright completed the GIS linking in the pilot project. This part of the document will be updated with more information upon completion of the pilot project.

Once the county has completed scanning and renaming of the tie cards, send the data to Lorraine Wright (lwright@idem.IN.gov) for the linking of the scanned tied cards to the Point Grid map (shapefile). Once the data is linked, all the information will be available to the County in a free GIS viewer software. The final product will result in a "Tie Card Framework layer" in a GIS software.

Phase VI
Create a Tie Card layer in a GIS viewer that can be accessed and viewed over the internet.

Indiana Geological Survey is working toward incorporating the Bartholomew County Tie Card Project on line where it will be able to be viewed on their GIS web viewer. More information to come as the Project becomes available on the website.